

UNITED STATES PATENT OFFICE.

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SYNTHETIC-MILK COMPOUND AND PROCESS OF PRODUCING SAME.

SPECIFICATION forming part of Letters Patent No. 746,502, dated December 8, 1903.

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To all whom it may concern:

Be it known that I, WILLIAM A. HALL, a citizen of the United States, residing at Bel-
lows Falls, in the county of Windham and
5 State of Vermont, have invented or discovered certain new and useful Improvements in Syn-
thetic-Milk Compounds and Processes of Pro-
ducing Same, of which the following is a
specification, reference being had therein to
10 the accompanying drawings.

It is generally supposed that milk is com-
posed of a very fine emulsion and that the
casein which it contains is held very finely
divided in suspension and quite largely
15 through the aid of calcium salts. It has
always been desired to take advantage of
this fact, and thus produce a synthetic milk
from ordinary commercial casein and milk-
sugar, with or without milk-oil or butter-fat.
20 I have discovered a process wherein this fact
can be accomplished.

To manufacture my synthetic milk I pro-
ceed as follows: Any good grade of ordinary
dry commercial casein may be dissolved by
25 the aid of any suitable alkali, preferably bi-
carbonate of soda, the amount of alkali de-
pending upon the acidity of the casein.
When a complete solution is obtained by the
aid of heat and water, the casein is again
30 evaporated to dryness by the aid of a vacuum-
pan or any other convenient method, or in
place of making a complete solution of the
casein I find that I am able to grind ordinary
dry commercial casein to about the consist-
35 ency of coarse granulated sugar, then put
the casein in a mixer of some sort, and gradu-
ally add the amount of alkali which would
be necessary in case the alkali was put into
the casein dry, and in this case the alkali is
40 mixed with the smallest amount of water
which will make a complete solution of the
alkali and is gradually poured onto the casein
as it revolves in the mixer, thus coating and
to some extent saturating every particle of
45 casein with a solution of alkali, and conse-
quently rendering it very easily soluble when
water is added. However, either one of the
above processes or any process whereby the
casein is rendered very easily soluble will an-
50 swer my purpose. In either case the casein af-
ter being treated with the alkali and dried is
ground to a very fine mesh, preferably about

one hundred and twenty. I now add calcium
chlorid or its chemical equivalent to this finely-
ground soluble casein. I prefer, however, to 55
use calcium chlorid, as it is comparatively
cheap and imparts no taste to the synthetic
milk when dissolved and only a very small
amount is necessary to secure the desired re-
sults. The calcium chlorid partially coun- 60
teracts the solution of the casein and leaves
the latter in a very fine suspension, about as
it exists in natural milk, thus imparting the
desired whiteness thereto.

After the addition to the soluble casein of 65
the dry calcium chlorid dry milk-sugar in
the proportion in which milk-sugar is ordi-
narily present in normal cow's milk is added
to the casein mixture, and if the synthetic-
milk composition is to contain the ingredients 70
of whole or unskimmed milk the desired
amount of butter-fat is then added. The re-
sulting product is then thoroughly mixed
and, if necessary, spread on trays and dried.
It is then ready for the market. 75

To enable those skilled in the art to prac-
tice my invention or discovery, I give below
the preferred proportions necessary to com-
pound the article. To about eighty-five parts
of ordinary dry commercial casein I add about 80
ten parts of bicarbonate of soda or equivalent
alkali previously dissolved in the smallest
possible amount of water. This alkaline so-
lution is gradually added to the dry casein,
the casein being agitated or stirred in the 85
meantime, and in this manner each individ-
ual particle of casein is coated with the alkali,
and thus rendered soluble. The soluble ca-
sein is then dried and ground to a very fine
mesh, preferably about one hundred and 90
twenty. I then add about two parts of finely-
powdered calcium chlorid or its chemical
equivalent to this mixture, and to about every
four and one-half parts of the casein thus pre-
pared I add about five parts of powdered milk- 95
sugar, and if a "whole" synthetic composi-
tion is desired I also add about five parts of
a suitable butter-fat. These ingredients are
then thoroughly mixed together, and the com-
pound (preferably in dry condition) is then 100
ready for the market.

To produce the synthetic milk, about
ninety-five parts of cold water are added to the
commercial compound, and then by heating